

7.2 Area Between Curves

definition

$\Delta A = h \cdot \Delta x = [f(x_i) - g(x_i)] \Delta x$

$\lim_{n \rightarrow \infty} \sum_{i=1}^n [f(x_i) - g(x_i)] \Delta x$

$\int_a^b f(x) - g(x) dx$

upper lower

$\int_c^d h(y) - j(y) dy$

right left

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Find the area of the region between $y = \sec^2 x$ and $y = \sin x$ from $x=0$ to $x=\pi/4$

$\int_0^{\pi/4} \sec^2 x - \sin x dx$

$\tan x + \cos x \Big|_0^{\pi/4}$

$(\tan \frac{\pi}{4} + \cos \frac{\pi}{4}) - (\tan 0 + \cos 0)$

$1 + \frac{\sqrt{2}}{2} - 1 = \frac{\sqrt{2}}{2}$

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Find the area of the region enclosed by the parabola $y=2-x^2$ and the line $y=-x$.

$\int_{-1}^2 2 - x^2 - (-x) dx$

$\frac{9}{2} = 4.5$

$2 - x^2 = -x$

$x = -1, 2$

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Find the area bounded above by $y = \sqrt{x}$ and below by the x-axis and the line $y = x-2$

a) by integrating with respect to x

b) by integrating with respect to y

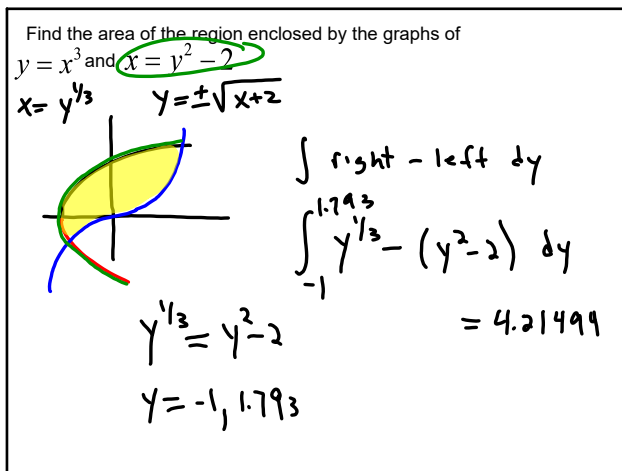
$\int_0^2 \sqrt{x} - 0 dx + \int_2^4 \sqrt{x} - (x-2) dx$

$\frac{10}{3}$

$h = x_2 - x_1 = y + 2 - y^2$

$\int_0^2 y + 2 - y^2 dy = \frac{10}{3}$

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